

Low Power Wide Area Networks (LPWAN)



What's LPWAN

- wireless telecommunication wide area network designed to allow long range communications.
- Significant characteristics
 - Low power
 - Low bit rate
 - Wide Area



Why LPWAN

Useful for independent devices

Access to remote locations

Suitable for physically, energy, and computationally constrained devices

Suited to IoT!

Why LPWAN for IoT

- IoT devices deployed in "the field"
 - Direct access without gateways etc.
 - Simpler with reduced cost
- Short range wireless (Zigbee, Bluetooth etc.) requires infrastuture set up:
 - Firewalls, gateways, NAT etc.

Short range radio connectivity for IoT devices:



Direct long range connectivity (LPWAN) for IoT devices:





- 100s of bits/second.
- Multimedia
- Documents
- Sensor data
- Location data
- Machine 2 Machine data

LPWAN usage

LPWAN and IoT

- Some use cases not suitable for standard wireless tech
- Can provide back-up connectivity for higher BW devices.



Comparison





LPWAN Topologys

- Star Topology
 - No need for wireless network routing protocols
- Direct Connection:



LPWAN Topologies

- Indirect Device connection:
 - Devies connected to gateway using BLE/Zigbee.
- Gateway typically mains powered
- Can provide greater security at gateway



As in most radio systems, the link budget is an important measure for power calculation. The link budget calculates the power received at the receiver and accounts for gains and losses along the transmission path.





Use Cases – Smart Metering

- Commodity consumption
- No need for visits/concentrators



Use Case – Utility Monitoring

- Fire Hydrants
- Portable Defoliators
- Need to be sure they function when required



Use Case -Tracking

• Track location of goods/Equipment



Use case -Agriculture

Monitor livestock and envornment





Use Case – "Silver Economy"

• Proactive Health monitoring

sigfox LORa®

LPWAN Technologies

• Sigfox

- proprietary technology
- communication using the Industrial, Scientific and Medical ISM radio band
- 868MHz in Europe and 902MHz in the US
- LoRaWAN
 - LoRa alliance is an open, non-profit association of members.
 - intended for wireless battery operated Things in a regional, national or global network.

SigFox Introduction

- Market leader
- One network
 - No roaming
- Nearly full coverage in Ireland/France and large parts of Europe
- Open hardware approach
 - Sell access to service

Range



Outdoor and Indoor

- Good Indoor propagation
 - We'll find out...
- There will be signal attenuation

Messages

- Payload up to 12 bytes
- Up to 140 times each day from a device (About 100b/s)
- Devices can receive data from application